

HANDLEBAR/STEM MOUNTED BICYCLE WHEEL HOLDING DEVICE

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5 Related Applications

Patent application serial number 10/226437 entitled "Bicycle Wheel Holder" filed on 08/23/2002; patent application serial number _____ entitled "Seatpost Mounted Bicycle Wheel Holding Device" filed concurrently with this application; and patent application serial number _____ entitled "Bicycle Wheel Bag" also filed concurrently with this 10 application are all commonly owned along with this application and are hereby incorporated by reference in their entirety herein.

Field of the Invention

This invention relates generally to a device for holding a bicycle wheel. More 15 specifically, the invention relates to a device removably mountable to one or both of a stem and handlebar of a bicycle for carrying a bicycle wheel such as during transport of the bicycle.

Background

Many types of rooftop bicycle carriers (or racks) require the front wheel of a bicycle be 20 removed when mounting the bicycle on the carrier. The front wheel is typically stowed in the vehicle or is secured to the rooftop carrier using a separate fixture that clamps to the wheel at its axle. As can be appreciated, the wheel may be dirty, especially if the wheel is from a mountain bike, and putting a dirty wheel in the vehicle is often undesirable. The separate wheel fixtures that mount directly to the carrier are also often undesirable because they can be expensive and 25 take up limited rooftop space that could otherwise be used to carry additional bicycles.

Several wheel holders have been proposed to secure the front wheel while the bicycle is being transported on a rooftop carrier. In U.S. patent no. 5,588,661 of Wolfe, a bracket is disclosed that is affixed to the rear dropout of a bicycle frame. When the bicycle is placed in the rooftop carrier, the axle of the front wheel is secured into a slot provided in the bracket by 30 tightening the wheel's quick release mechanism. The bracket has several drawbacks. First, it is not easily removable from the bicycle and is intended to remain on the bicycle adding

unnecessary weight. Second, since the front wheel is supported at the axle on only one side of the axle, the stress on the axle from the weight of the wheel and wind load during transport could cause damage to the axle and the wheel's hub.

In U.S. patent No. 5,779,119 of Talbot, a wheel holder is disclosed that is secured onto the 5 seatpost of a bicycle and includes an extension arm with spaced fingers extending therefrom. The fingers have slots formed in their distal ends and the slots are adapted to receive the axle of the bicycle's front wheel. The holder requires the use of a clamping mechanism to secure it to the seatpost. While Talbot clamping mechanism may be effective in attaching the holder to the bicycle's seatpost, it requires several interconnected moving parts that increase the total cost to 10 produce the holder, especially when compared to a holder with an attachment mechanism that does not include interconnected moving parts. Further, since the fingers of the Talbot holder are shorter than the radius of the front wheel, the extension arm of the holder must be passed through the spokes of the intended bicycle wheel so that the spaced slots can be aligned with the ends of the wheel's axles. As can be appreciated, passing the extension arm through the spokes with the 15 slotted fingers that extend perpendicularly therefrom can be awkward especially when the associated front wheel includes closely spaced spokes. Finally, the design of the Talbot holder requires the device to extend generally in a direction generally perpendicular to the bicycle. Given this configuration, the wheel and the end of the extension arm could interfere with the mounting of additional bicycles onto an associated rooftop carrier, especially when more than 20 two bicycles are to be transported by a single carrier.

Summary of the Invention

In a first preferred embodiment, a device for securing a bicycle wheel to a bicycle is described. The device comprises a generally u-shaped form having first and second arm portions 25 extending from a base portion. The arm portions are spaced from each other proximate the base portion a sufficient distance to permit a handlebar stem of the bicycle to fit therebetween. The first and second arm portions terminate in first and second ends. The first and second ends are spaced from each other with the first end having a first dropout attached to it, and the second end having a second dropout attached to it. The first dropout includes a first slot and the second 30 dropout includes a second slot, wherein the first and second slots are substantially aligned with each other and are adapted to receive the ends of an axle of the bicycle wheel therein.

In a second preferred embodiment, a device for attaching a bicycle wheel to a bicycle comprises (i) a generally V-shaped portion including two legs, (ii) first and second support arm portions, and (iii) first and second dropouts. Each support arm portion intersects with an end of one of the legs of the V-shaped portion at a proximal end forming a first angle. Each support arm portion extends from the proximal end to a distal end. The first dropout portion is attached to the distal end of the first support arm portion, and the second dropout portion is attached to the distal end of the second support arm portion, each of the first and second dropout portions include a slot formed therein for receiving a portion of an axle of the bicycle wheel. The slot of the first dropout portion is substantially aligned with the slot of the second dropout portion.

10 In a third preferred embodiment, a device for attaching a bicycle wheel to a bicycle comprises (i) a framework adapted to brace against one or both a stem or handlebar of the bicycle without a clamping mechanism having interconnected moving parts, and (ii) a wheel attachment mechanism coupled with the framework for securing the bicycle wheel to the device.

15 In a fourth preferred embodiment, a method of attaching a bicycle wheel to the stem or handlebar of a bicycle is described. The method comprises bracing a wheel attachment device against at least one of a handlebar stem and a handlebar of the bicycle; and securing the bicycle wheel to the wheel attachment device.

20 Numerous other embodiments and variations of the embodiments are also contemplated as is provided in this specification including the appended claims and as would be obvious to one of ordinary skill in the art with the benefit of this disclosure.

Brief Description of the Drawings

Figure 1 is an isometric view of a preferred embodiment of the wheel holding device.

25 Figure 2 is an isometric view of the preferred embodiment attached to a bicycle.

Figure 3 is an isometric of the preferred embodiment attached to a bicycle with a wheel attached to the holding device.

Figure 4 is an isometric view of an alternative embodiment wheel holding device clamped to the stem extension of the bicycle with a wheel attached to the device.

30 Figure 5 is a flow chart illustrating a method of using a wheel holding device.

Detailed Description

A device for attaching to one or both of a stem and handlebar of a bicycle and holding a
5 bicycle wheel is described. Accordingly, the device can be utilized to hold a front wheel of a
bicycle when the bicycle with the front wheel removed from the front fork dropouts is mounted
on a rooftop carrier of an automobile for transport. In one preferred embodiment, the device
comprises a wireform having two spaced and opposed dropouts to receive the ends of an axle of
a bicycle wheel therein. The wireform of the preferred embodiment is adapted for quick
10 attachment to the stem and/or handlebar of the bicycle. Further, the bicycle wheel is held in front
of the handlebar in a position that does not interfere with the mounting of additional bicycles on
the carrier. This maximizes the number of bicycles that can be carried on a single carrier,
especially when compared to a rooftop carrier utilizing separate fixtures to hold the front wheels.

15 **Terminology**

The term “or” as used in this specification and the appended claims is not meant to
exclusive rather the term is inclusive meaning “either or both”.

One Preferred Embodiment

20 Figure 1 is an illustration of one preferred embodiment of the device 100. The device
includes (i) a form or framework typically including a wireform 102 generally comprised of
specifically bent and formed metallic rod and (ii) dropouts 104 attached to ends of the wireform
for receiving the ends of an axle of a bicycle wheel therein. The metallic rod is typically steel
having a diameter of about 0.375”-0.50”, although in variations, the material could comprise an
25 aluminum alloy, titanium alloy or other metal. Further, although the rod is typically cylindrical,
other cross-sectional shapes can be utilized. The rod may be solid or tubular. Additionally, in a
variation, the rod could be comprised of a plastic material reinforced with glass fibers, graphite
fibers or another suitable reinforcing material. While the rod can be bent into the illustrated
configuration, the wireform can also be cast, forged, or molded as well.

30 Referring to Figure 1, the wireform 102 includes a V-shaped (or U-shaped) portion 108,
which comprises a curved bottom 110 and two legs 112 that extend from the curved bottom and

diverge from each other. The distal ends of the legs intersect with proximal ends of first and second support arm portions 114 of the wireform forming an angle therebetween. Typically, the intersections 115 of the legs of the V-shaped portion and the support arms are curved, each having a radius of about 0.375-0.50 inches or greater. The angle formed between the legs and 5 arms is typically about 30-100 degrees, although smaller and larger angles are possible in variations of the device. Each support arm extends from its associated intersection at least a distance equal to the radius of the bicycle wheel to be held by the device, and is spaced from and parallel to the other support arm. Each arm terminates at the associated dropout 104.

The dropouts 104 include U-shaped slots 106 that are sized to receive the ends of a 10 typical bicycle wheel axle therein. The dropouts are spaced from each other at the distal ends of support arm portions of the wireform at a distance generally corresponding to the width of a typical hub of a front bicycle wheel. The dropouts are attached to the wireform in any suitable manner such as welding, brazing, mechanical fastening and adhesive fastening. Further, the dropouts can be integrally formed with the wireform. For instance, a steel solid or tubular rod 15 can be stamped to plastically deform the ends of the wireform into flattened dropouts. The slots can be formed during the stamping operation or they can be cut into the formed ends in a separate operation.

In the preferred embodiment, the V-shaped portion 108, the curved intersections 115 and some of the support arm portions 114 proximate the curved intersections are covered with a 20 protective covering 116. In one variation, the covering comprises a dip coated polymeric covering. In another variation, the covering comprises flexible plastic or rubber tubing that is slid over the wireform and into place. The protective covering may comprise other materials as well including, but not limited to, fabric and leather. Further, the covering may be attached to the wireform using any other suitable method including but not limited to adhesive bonding and 25 stitching.

Referring to Figures 2 and 3, the preferred embodiment device 100 is shown attached to a bicycle 200. The curved bottom 110 of the V-shaped portion 108 is braced against the underside of the extension section 204 of the bicycle's handlebar stem 202 while the curved intersections 115 rest on the topside of the handlebar 206. The support arms 114 extend forwardly from the 30 handlebar. Accordingly, the device is prevented from pivoting downwardly about the handlebar by the curved bottom and the device is hindered from pivoting left and right by the two legs 112

of the V-shaped portion that are generally in contact with the side surfaces of the stem extension 204. It is appreciated that the preferred embodiment does not utilize a clamping mechanism comprising interconnected moving parts, such as a hinged clamp or an endless band clamp. By foregoing a clamping mechanism, the cost of fabricating the device is reduced. Further, the 5 manner in which the preferred embodiment wheel holding device is braced against the handlebar or stem facilitates relatively rapid deployment and removal of the device and the associated wheel.

The front bicycle wheel 208 is (i) slid between the support arms 114, (ii) received into the spaced slots 106, and (iii) secured to the device in a manner similar to securing a front wheel to 10 the dropouts of a bicycle's front fork 210. By tightening quick release skewers 212 or tightening a bolt (not shown) onto a threaded axle, the inside surfaces of the dropouts 104 are braced against the hub 214 to secure the wheel to the device. The weight of the wheel cantilevered by the support arms off of the top surface of the handlebar generally prevents the device from moving upwardly. However, when transporting the bicycle mounted on a rooftop bicycle rack of 15 an automobile (the track 220 of a rooftop rack is partially illustrated in Figure 3), bumps and imperfections in a roads surface can cause the front wheel and the device to bounce up and down. To stabilize the front wheel and the device and prevent undesirable movement of the front wheel, a strap 118 is provided to anchor the wheel to the bicycle. The strap is typically passed around the rim 218 of the wheel and around either the fork 210 or frame 216 of the 20 bicycle. Preferably, the strap comprises hook and loop material to fasten it around the bicycle and the rim, although any suitable manner of securing the strap is acceptable including, but not limited to, buckles and D-rings. It is to be further appreciated that the strap may comprise any article used to stabilize the wheel including, but not limited to, cable, rope and twine.

25 A First Alternative Embodiment

Referring to Figure 4 an alternative embodiment wheel holding device 300 for attaching to the stem 202 of a bicycle 200 is illustrated. The alternative embodiment device comprises a hinged clamp 302 that wraps around and locks against the extension portion 204 of the stem through a lever mechanism 304. In other variations of the alternative embodiment device the 30 clamp can be sized and configured to attach to the handlebar 206. A leg 306 extends outwardly from the clamp from which two wheel support arms 308 append. The support arms are spaced

from each other and each terminate at aligned slots (not clearly shown) in which the axle of a bicycle wheel 208 is received and is typically held in place by a quick release mechanism of the wheel.

5 A Method of Using the Device

Referring to Figure 5, flow chart 400 describes the preferred use of the bicycle wheel holder device in conjunction with a rooftop or similar rack for transporting a bicycle on an automobile.

First, as indicated in block 402, the front wheel 208 of the bicycle 200 is removed from 10 the front fork 210 of the bicycle and is typically set aside. Next as indicated in block 404, the bicycle sans its front wheel is placed in the rooftop carrier. Typically, the rear wheel 222 is placed in a track 220 provided on the carrier and the dropout slots of the front fork are placed in a dummy axle 224 on the carrier. A quick release cam bolt 226 or nuts (not shown) are tightened to secure the front fork to the dummy axle.

15 As indicated in block 406, the wheel holding device is attached to one or both the stem 202 and handlebar 206. In the preferred embodiment, the curved bottom 110 of the V-shaped portion 108 is placed underneath the stem extension 204 in contact with the bottom side of the stem extension, and the intersections 115 between the support arms and the legs of the V-shaped portion are placed in contact with the topside of the handlebar. This configuration braces the 20 device in place. The protective coating 116 of the device prevents the device from scratching or abrading either or both the handlebar and stem. Concerning the described alternative embodiment, the wheel holding device 300 is clamped to one of the handlebar and the stem.

Referring to block 408, the front wheel 208 of the bicycle 200 is secured to the wheel holding device. In both the preferred embodiment and the described alternative embodiment, the 25 wheel is attached to the device at the axle of the wheel by clamping the axle to slotted dropouts via bolts or a quick release mechanism 212. In other variations and embodiments of the wheel holding device, the wheel can be secured to the holder by other suitable means such as, but not limited to, clamps or straps that restrain the rim 218, tire 228 and/or spokes 230 of the wheel to an appropriately configured wheel holding device.

30 Finally as indicated in block 410, the front wheel 208 is strapped to the frame 216 and/or fork 210 of the bicycle 200 as shown in Figure 3 to prevent the wheel and wheel holding device

combination from bobbing up and down during transport. It is appreciated that a strap 118 may not be required in all embodiments of the wheel holding device.

Although the method of securing a bicycle 200 and its front wheel 208 to a rooftop bicycle rack has been described with reference to the particular order of operations illustrated in 5 Figure 5, the actual order of operations can vary as would be obvious to one of ordinary skill in the art. For instance, the wheel holding device and the wheel could be secured to the bicycle before the bicycle is placed in the rooftop rack. Further, the same method may be applicable to other types of racks and accordingly, the described method is not intended to be limited just to use with rooftop racks but with any suitable type of rack where a wheel of the bicycle must be 10 removed before securing the bicycle in the rack.

Other Alternative Embodiments

The preferred embodiment and alternative embodiment of the wheel holding device as illustrated in the accompanying figures and described herein are merely exemplary and are not 15 meant to limit the scope of the invention. It is to be appreciated that numerous variations to the invention have been contemplated as would be obvious to one of ordinary skill in the art with the benefit of this disclosure. All variations of the invention that read upon the appended claim language are intended and contemplated to be within the scope of the invention.

For instance, the shape of the wireform could vary substantially along with the manner in 20 which it braces against the handlebar or stem. A generally horizontal variation of the generally vertical attachment portion of the wireform disclosed in the concurrently filed and commonly owned United States patent application entitled _____ (serial # _____) could be utilized to attach the wheel holding device to the stem extension. Further while the device has been primarily described with reference to a wireform, alternative 25 embodiments need not utilize a wireform, rather any type of framework is suitable that facilitates the securing of a bicycle wheel to the bicycle in the manner required by the appended claims.